



Soil Exploration,
Earthwork, Foundation,
Ground Improvements and
other Civil Engineering Problems

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RIVER
MINING

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MINING SAND FROM RIVER BY LEASE HOLDER

1.0 Introduction:

River sand was obtained by suppliers of building materials since decades. Up to 1973-75, river Tapti carried sediments 60 to 90000 PPM during floods. These sediments formed soals, islands of sand over original river bed. As river was not flowing after Nov., such islands / soals were dug up to obtain construction material. Occasionally one meter deep sand, below meter deep tidal water, was excavated by divers by basket. Such activity did not disturb the original bed material of river (generally below RL (-) 2 to 0.0, 10 to 15 m thick) deposited in fault flood plane of river over past thousand's of year. The delta of river in Surat and around has wide river channel meandering in S shape over wide flood plane of around 3 to 5 km or so. The original sand bed has been an active source of natural water recharging soil, wells and ponds on coastal belts. This strata, during flood, charges ground water sources up to RL (+) 10 m or so around. The system, over years has led to geological, ecological equilibrium river regime within flood plane.

2.0 Definitions:

For the purpose of lease for mining of sand in river, there are hardly any detailed definitions / specifications of technical and legal aspects. The lease holders, by their actions, claim exclusive rights of mining all materials, silt, sand, soil in area allotted, to any depth, dredged or dug by any technology. He has mined banks, acquired by government for flood protection palas – above tidal level. Ignoring even others safety, the jet wash dredging technology for mining, used stored drinking water of SMC probably without any permission or price, for sand mine, related activities – making bund, approaches, pala, temporary roads, dumping soil (not required) in river at any place making hundreds of "Tekaries" at places of his choice. He almost bridged river near Gaypagala stopping normal inflow of water to reservoir and threatened SMC by legal actions. This means lease holder can play with only source of drinking water to city & industry of Surat and Gov. may become helpless awaiting legal strictures.

Leaser has no knowledge nor liability to owner or public for his activities and related indirect impact on the social – economical aspects safety of structures in river (weir, bridges) and on banks such as flood protection pala, regulators, villages, aquafer of banks, quality of irrigation & drinking water etc. Prima-facie undefined lease of mining of sand in river can lead to disastrous impact on ecological, hydrological (flood) regime, ground water and quality of drinking / industrial water for city of Surat & Hazira. Open mines for coal & minerals have strict safety requirements for surroundings. Here the depth of mining is undefined. Extent of safe width and safe technology for mining in drinking water reservoir have never been defined. The exercise of the controls, by one powerless non technical staff for district, is impossible even if prescribed. The socio-political and required extent and type of patrolling in selfish - corrupt society, needs to be

assessed. The lease policy itself in terms of economics, long term social security and disastrous side effects needs to be reviewed by Government for state as a whole. Expenses incurred by public bodies – SMC, other Government services like disaster-management & flood damages compensation over years are national loss of assets and must form part of cost / benefit ratio of project of leasing.

3.0 Case Studies:

Mining underwater is skilled technical job requiring a design and safety inspection by competent authority equipped with modern technology tools. The case studies, by preliminary analysis by social activist, have proved impact of deep mining under water by using hydraulic pumping beyond doubt. The qualitative & quantitative detailed study can be initiated by Gov. R& D department to evolve socio-economical safe policy for granting lease for mining.

3.1 Damages to Hydraulics of Rivers:

The bed levels of river slope have been totally disturbed. Fig. 1 shows reduced negative slope of Tapti. The average bed slope (S) 1/1500 has been reduced to almost 1/6 in 30 km section u/s of Singapore weir. The bed material and its smoothness, coefficient has been changed from sand to silt & fine clay deposits after mining. The effect is obviously higher flood level (afflux) to keep continuity in flow of river. This impact is reflected by recent GOG, decision to raise flood palas to RL 16.0 m from present RL 14.0 m.

3.2 Damaged Intake Water Works:

The mud dumps by miners have changed flow from water intake structures (SMC). It has also created large silt & fine clay deposits by miners disposal of top clay cover. Scour and silting have destabilized and reduced efficiency of intake wells of SMC at Sarthana, Katargam etc. The quality of water, of course, was spoiled by dredging operations of lease holders using same reservoir jet to wash bore and sand & leave sediment in reservoir. It took years to realize that problems are caused by sand mining, quantitative studies are not available.

3.3 The Gaypagala and hundreds of silt bunds in river created by dumps of the top clay silt layer over mine sand have been partly responsible for growth of hyacinth, increased bacteria and reduced flow of water available inspite of release from Ukai. Story of Gaypagala and problems of district administration SMC and Court are well known to city. Prima-facie lease holder's action may lead to crisis of drinking water in quality & quantity is undisputed. Extent ofcourse cannot be defined.

3.4 Damage to regime of River:

The changed flow, turbulence and piping action created by hydraulic technology for mining have resulted in,

- 1) Widening of river to 1½ to 2 times normal width,
- 2) Flow of sand bed below banks near Bharimata, Rander - Ashram Zone, etc. Such movements endangered city from floods. The restoring of the banks and safety now undertaken will cost in crores to SMC and Government.
- 3) Movements of type (2) with slip-circle arc failure of banks, have brought disaster to stone walls near LIC Building. The river bank upto 14 m height with slope (2:1 to 3:1) was stable till its toe was mined and height of bank be increased to 16 to 20 m.

- 4) The erosion of banks and channel endangered the weir Singanpore due to mining almost 2 km away from weir. The preparation of mining creates piping condition and flow of sand from surrounding long distances. The emergency repair of pockets u/s of weir spending crores amounts to SMC placing stones & fabric in pits dug by sand mine lease holders. The cost of repairs exceeded cost of sand mined and hence even slightest probability do not justify mining if long term overall state & national view is taken.
- 5) Very unfortunate is mining lease holders or leaser do not keep any record of extent, type and time of mining. This makes analysis of cost, benefits and damages, if any, impossible.

4.0 Economics:

The river bed sand mining is permitted with a view to collect revenue by state. I don't think non availability sand should be looked up as essential commodity for development. This is based on information that there is no obligation of miner to supply sand at specified price.

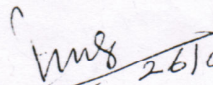
Then project must be viewed from angle of economics. The income of project must be assessed to evaluate benefit – Social, Economical, Environmental, Ecological aspects. The cost involve in long term problems directly or indirectly by mining activity namely disaster management, raising of flood palas, flood damages to banks & structures, increased cost of treatment to river regime, water for drinking by 3 million, etc. As explained earlier cost of public, private & corporate bodies due to after effects of activity like uncontrolled mining using water from drinking water source even a part, would pending R & D, suggest pennywise found foolish situation.

5.0 R & D related to Mining:

The technical problems involved by leasing river bed for uncontrolled mining, its economic overall benefit to society and risk involved for river 10 km long is duty and responsibility of the Government who is granting lease. They have like, structural designers, in case of earthquake proof design legal responsibility to certify that permitted mining will not create damage to river regime, structures in & on banks in the area, involve long term safety of banks by erosion / afflux and contaminate water used for drinking purpose.

The mining will have to specify location, depth, technique of mining top soil, placing it, etc. It must prohibit use of reservoir water for water supply for mining (washing of deep sand with salinity and fines) dumping of soil cover over sand to make service bunds and road dyke in river (changing regime and ecology-flow). The present office being incapable of field controlling special non-corrupt vigilance squads day & night may have to be created (Cost!)

The drafting legal, documents for public safety and compensation for damages will have to be assigned to experts.


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